

STANDARD

SEDIMENT BASIN (No.)

Definition

A basin constructed to collect and store debris or sediment.

Scope

This standard applies to the installation of all basins where the primary purpose is to trap and store waterborne sediment and debris.

Purpose

To preserve the capacity of reservoirs, ditches, canals, diversions, waterways, and streams; to prevent undesirable deposition on bottom lands and developed areas; to trap sediment originating from construction sites; and to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Conditions Where Practice Applies

This practice applies where physical conditions or land ownership preclude treatment of a sediment source by the installation of erosion-control measures to keep soil and other material in place or where a sediment basin offers the most practical solution to the problem.

Planning Considerations for Water Quantity and Quality

QUANTITY

1. Effects on the water budget, especially volumes and rates of runoff, infiltration, evaporation, deep percolation, and groundwater recharge.
2. Effects on downstream flows and aquifers that would affect other water uses and users.
3. Effects on volume of discharge flow on the environmental, social, and economic conditions.
4. Effects on the water table downstream and the results of changes of vegetative growth.

QUALITY

1. Effects on erosion, movement of sediment, pathogens, and soluble and sediment-attached substances.

2. Effects on the visual quality of onsite and downstream water resources.
3. Effects of construction and early establishment of protective vegetation on the surface and groundwater.
4. Effects on wetlands and water-related wildlife habitats.

Design Criteria

The capacity of the sediment basin shall equal the volume of sediment expected to be trapped at the site during the planned useful life of the basin or the improvements it is designed to protect. If it is determined that periodic removal of sediment will be practicable, the capacity may be proportionately reduced.

The design of dams, spillways, and drainage facilities shall be according to SCS standards for ponds (378) and grade stabilization structures (410) or according to the requirements in TR-60, as appropriate for the class and kind of structure being considered.

Temporary basins having drainage areas of 5 acres or less and a total embankment height of 5 ft. or less may be designed with less conservation criteria if conditions warrant. The embankment shall have a minimum top width of 4 ft. and side slopes of 2:1 or flatter. An outlet shall be provided of earth, pipe, stone, or other devices adequate to keep the sediment in the trap and to handle the 10-year-frequency discharge without failure or significant erosion.

Provisions shall be made for draining sediment pools if necessary for safety and vector control. Fencing and other safety measures shall be installed as necessary to protect the public from floodwater and soft sediment. Due consideration shall be given to good visual resource management.

Plans and Specifications

Plans and specifications for installing sediment basins shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Basin Specifications

Construction of sediment basins within the scope of the standard for ponds (378) shall have, as a minimum, specifications commensurate with those for ponds (378). Those within the scope of TR-60 shall be in accord with the guide specifications contained in the National Engineering Handbook, Section 20.

Design Criteria

STORAGE CAPACITY. The site should be selected to provide adequate storage for at least 0.5 inches depth of sediment storage from the disturbed area and 1.0 inch depth of runoff from the drainage area. When necessary, consideration should be given either to excavating additional storage capacity to meet these requirements or to plan for periodic clean-out in order to maintain the capacity requirements. (One-half inch (0.5) of storage per acre equals 67 cubic yards per acre.)

Note: Sediment basins shall be cleaned out when the effective storage capacity drops below 0.2 inches per acre of drainage area. The elevation corresponding to this level shall be determined and given in the design data as a distance below the top of the riser. Two-tenths inches (0.2) of storage per acre equals 27 cubic yards per acre.

SURFACE AREA AND DEPTH. The average basin length should be at least twice the average width. The average design depth shall be at least 4 feet.

Pipe Spillways - The pipe spillway should be designed to handle not less than 5 inches runoff from the drainage area in 24 hours (i.e. 5 inches runoff or 0.21 cfs per acre of drainage area). The pipe spillway should consist of a vertical pipe or box type riser joined to a horizontal pipe (barrel) which will extend through the embankment. The riser should be perforated to provide a gradual drawdown in the reservoir to a planned elevation after each storm event.

The riser pipe should be perforated with 1-inch diameter holes spaced eight inches vertically and 10-12 inches horizontally all around. The lower one-third of the perforated riser should be covered, cone shaped, with suitable filter material to provide complete drainage of the pool and adequate filtration during periods of low inflow.